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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/819,675

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Gary L. McAlpine

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EXAMINER

HAN, CLEMENCE S

ART UNIT

PAPER NUMBER

2665

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/819,675

Applicant(s)

MCALPINE, GARY L.

Examiner

Clemence Han

Art Unit

2665

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. Figure 1A-1C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.

- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
 - (1) Field of the Invention.
 - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

The section (f), Brief Summary of the Invention, is missing from the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Jones (US Patent 5,841,773).

Regarding claim 1, Jones teaches a switch element comprising: a plurality of input interfaces 12 to receive data; a plurality of output interfaces 13 to transmit said data; and a buffer 18 to couple to said plurality of input interfaces and to said plurality of output interfaces, the buffer including a multi-dimensional array of output queues to store said data (Column 3 Line 10-13), wherein said multi-dimensional array of output queues is shared by said plurality of output interfaces (See Figure 1).

Regarding claim 2, Jones teaches said multi-dimensional array of output queues comprising a three-dimensional array of output queues (Column 2 Line 48-49 and Column 3 Line 10-19).

Regarding claim 3, Jones teaches said three-dimensions comprising: a) a first dimension relating to a number of outputs on said switch element (Column 3 Line 11-12); b) a second dimension relating to a number of logical paths for said data (Column 3 Line 13); and c) a third dimension relating to a number of outputs from a next element (Column 2 Line 48-49).

Regarding claim 4, Jones teaches said logical paths as assigned

priority levels (Column 3 Line 15 and Column 3 Line 30-34).

Regarding claim 5, Jones teaches said multi-dimensional array of output queues sharing space of said buffer (Column 3 Line 10-25).

Regarding claim 6, Jones teaches a plurality of virtual input queues 18, wherein each virtual input queue represents a portion of said buffer (See Figure 1).

Regarding claim 7, Jones teaches an arbiter 20 to select data for transmission of said data to a downstream element (Column 3 Line 66-67).

Regarding claim 8, Jones teaches said arbiter selecting said data based on status information at said switch element (Column 4 Line 2-5).

Regarding claim 9, Jones teaches a queue status monitor 17 transmitting a feedback signal from said switch element to a plurality of upstream elements, said feedback signal comprising status information of output queues of said switch element (Column 3 Line 1-5).

Regarding claim 10, Jones teaches said arbiter selecting said data by utilizing transmit pressure information (Column 4 Line 8-29).

Regarding claim 11, Jones teaches a switch fabric network for transmitting data, said network comprising: a first switch element; and a second switch element coupled to said first switch element, said second switch element comprising: a plurality of input interfaces 12 to receive data from at least said first switch

element; a plurality of output interfaces 13 to transmit said data; and a buffer 18 to couple to said plurality of input interfaces and to said plurality of output interfaces, the buffer including a multi-dimensional array of output queues to store said data (Column 3 Line 10-13), wherein said multi-dimensional array of output queues is shared by said plurality of output interfaces (See Figure 1).

Regarding claim 12, Jones teaches said multi-dimensional array of output queues comprising a three-dimensional array of output queues (Column 2 Line 48-49 and Column 3 Line 10-19).

Regarding claim 13, Jones teaches said second switch element further comprising a plurality of virtual input queues 18, wherein each virtual input queue represents a portion of said buffer (See Figure 1).

Regarding claim 14, Jones teaches said second switch element further comprising an arbiter 20 to select data for transmission of said data to a downstream element (Column 3 Line 66-67).

Regarding claim 15, Jones teaches said arbiter selecting said data by utilizing transmit pressure information (Column 4 Line 8-29).

Regarding claim 16, Jones teaches a method of using a switch element in a switch fabric network, said method comprising: receiving data at an input interface 12 of said switch element; routing said data to one of a multi-dimensional array of

output queues provided within a buffer 18 of said switch element; and outputting said data from a selected one of said output queues (See Figure 1).

Regarding claim 17, Jones teaches said multi- dimensional array of output queues comprising a three-dimensional arrays of output queues (Column 2 Line 48-49 and Column 3 Line 10-19).

Regarding claim 18, Jones teaches said three-dimensions comprising: a) a dimension relating to a number of outputs on said switch element (Column 3 Line 11-12); b) a dimension relating to a number of logical paths for said data (Column 3 Line 13); and c) a dimension relating to a number of outputs from a next element (Column 2 Line 48-49).

Regarding claim 19, Jones teaches said switch element comprising a plurality of virtual input queues 18, wherein each virtual input queue represents a portion of said buffer (See Figure 1).

Regarding claim 20, Jones teaches selecting said data in one of said output queues prior to said outputting (Column 3 Line 66-67).

Regarding claim 21, Jones teaches said data selected based on status information at said switch element (Column 4 Line 2-5).

Regarding claim 22, Jones teaches said data selected by utilizing transmit pressure information (Column 4 Line 8-29).

Regarding claim 23, Jones teaches transmitting a feedback signal 17 from said switch element to a plurality of upstream elements, said feedback signal comprising status information of output queues of said switch element (Column 3 Line 1-5).

Regarding claim 24, Jones teaches a switch element comprising: a buffer 18 including a multi-dimensional array of output queues to store data; and an arbiter 20 to select one of said output queues for transmission of data, and a queue status monitor 17 to track the statuses of said multi-dimensional array of said output queues.

Regarding claim 25, Jones teaches said arbiter selecting said one of said output queues based on information of said switch element and information of a next element (Column 4 Line 2-5).

Regarding claim 26, Jones teaches said arbiter further selecting said one of said output queues based on transmit pressure information (Column 4 Line 8-29).

Regarding claim 27, Jones teaches said multi-dimensional array of output queues comprising three-dimensional output queues (Column 2 Line 48-49 and Column 3 Line 10-19).

Regarding claim 28, Jones teaches said three-dimensions comprising: a) a first dimension relating to a number of outputs on said switch element (Column 3

Line 11-12); b) a second dimension relating to a number of logical paths (Column 3 Line 13); and c) a third dimension relating to a number of outputs from a next element (Column 2 Line 48-49).

Regarding claim 29, Jones teaches a plurality of virtual input queues 18, wherein each virtual input queue represents a portion of said buffer (See Figure 1).

Regarding claim 30, Jones teaches said arbiter selecting said one of said output queues based on status information at said switch element (Column 4 Line 2-5).

Regarding claim 31, Jones teaches said queue status monitor 17 transmitting a feedback signal from said switch element to a plurality of upstream elements, said feedback signal comprising status information of output queues of said switch element (Column 3 Line 1-5).

Regarding claim 32, Jones teaches a method of communicating information in a switch element, said method comprising: receiving data 12 at said switch element; storing said data in one queue of a multi-dimensional array of output queues in a buffer 18 of said switch element; and selecting one of said output queues for transmission of data (Column 3 Line 66-67).

Regarding claim 33, Jones teaches selecting said one of said output queues comprising selecting based on information of said switch element and information of a next element (Column 4 Line 2-5).

Regarding claim 34, Jones teaches said selecting further based on transmit pressure information (Column 4 Line 8-29).

Regarding claim 35, Jones teaches said multi-dimensional array of output queues comprising a three-dimensional array of output queues (Column 2 Line 48-49 and Column 3 Line 10-19).

Regarding claim 36, Jones teaches said three-dimensions comprising: a) a first dimension relating to a number of outputs on said switch element (Column 3 Line 11-12); b) a second dimension relating to a number of logical paths for said data (Column 3 Line 13); and c) a third dimension relating to a number of outputs from a next element (Column 2 Line 48-49).

Regarding claim 37, Jones teaches said switch element including a plurality of virtual input queues 18, wherein each virtual input queue represents a portion of said buffer (See Figure 1).

Regarding claim 38, Jones teaches transmitting a feedback signal 17 from said switch element to a plurality of upstream elements, said feedback signal

comprising status information of output queues of said switch element (Column 3 Line 1-5).

Regarding claim 39, Jones teaches a switch comprising: a first output interface 13 associated with a first output link; a first queue 18 associated with said first output interface; and a first arbiter 20 associated with said first output interface and said first queue, wherein said first arbiter schedules a next data packet for transmission from said first output interface based on one of a pressure function and a local path priority (Column 4 Line 8-29 and Column 4 Line 40-67).

Regarding claim 40, Jones teaches said first arbiter scheduling said next data packet for transmission from said first output interface based on both said pressure function (Column 4 Line 8-29) and said local path priority (Column 4 Line 40-67).

Regarding claim 41, Jones teaches said first arbiter scheduling said next data packet based on calculated transmit priorities of target queues in a downstream element (Column 4 Line 40-67).

Regarding claim 42, Jones teaches said first arbiter scheduling said next data packet relating to a target queue having a highest calculated transmit priority (Column 3 Line 30-31).

Regarding claim 43, Jones teaches a second output interface 13 associated with a second output link, a second output queue 18 associated with said second

output interface, and a second arbiter 20 to schedule a next data packet for transmission from said second output interface.

Regarding claim 44, Jones teaches said pressure function related to a relationship of data in said switch and data in a downstream element (Column 4 Line 8-29).

Regarding claim 45, Jones teaches a method of scheduling data traffic from a switch, said method comprising: determining a transmit priority based on one of a pressure function (Column 4 Line 8-29) and a local path priority (Column 4 Line 40-67); and scheduling data traffic based on said determined transmit priority (Column 3 Line 66-67).

Regarding claim 46, Jones teaches said determining based on both said pressure function (Column 4 Line 8-29) and said local path priority (Column 4 Line 40-67).

Regarding claim 47, Jones teaches transmit priority further determined based on information of target queues in a downstream element (Column 4 Line 40-67).

Regarding claim 48, Jones teaches said scheduling comprising selecting a target queue of said downstream element having a highest calculated transmit priority (Column 3 Line 30-31).

Regarding claim 49, Jones teaches said pressure function related to a relationship of data in said switch and data in a downstream element (Column 4 Line 8-29).

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following patents are cited to further show the state of the art with respect to the switch in general.

U.S. Patent 5,689,500 to Chiussi et al.

U.S. Patent 5,953,318 to Nattkemper et al.

U.S. Patent 6,519,225 to Angle et al.

U.S. Patent 6,587,437 to Lee et al.

U.S. Patent 5,493,566 to Ljungberg et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clemence Han whose telephone number is (571) 272-3158. The examiner can normally be reached on Monday-Thursday 7 - 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571) 272-3155. The fax phone

number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C.H.

Clemence Han
Examiner
Art Unit 2665

Alpus H. Hsu

ALPUS H. HSU
PRIMARY EXAMINER